VIRGINIA WILDLIFE

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Photo courtesy S. C. S.

JUNE INTERLUDE

What better way to forget a day's trouble than tangling with a scrappy bigmouth bass.

Virginia WILDLIFE

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A Monthly Magazine Dedicated to the Conservation, Restoration, and Wise Use of Virginia's Wildlife and Related Natural Resources and to the Betterment of Hunting and Fishing in Virginia.

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In This Issue

Cover

A forlorn look comes to this cub black bear in anticipation of getting a new home at the children's zoo in Roanoke.

Commission photo by Kesteloo

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THE BEND IN THE ROAD

AS WE WRITE these few lines for the June issue the mighty Missouri is pounding wildly against the breastworks of Omaha and Council Bluffs. Already news headlines are proclaiming this the worst flood in the history of western civilization. Yet there's a note of irony, possibly even optimism, in the news as stout-hearted men, led by the indomitable engineers seek to stem the destruction of a rampaging river.

Such is the unfailing spirit of the creature—man. Just when the worst is about to happen, victory looms ahead.

Man has always battled nature since primitive days. Sometimes he's won, sometimes and probably more often, he's lost. Gradually, over the ages, the human mind has learned that man cannot work against nature, and win. He can only work with her, not against her. And so it is with the whole conservation picture. Man is learning, though it seems painfully slow, that our future, great as it is, is a hollow shell without the teamwork and help and laws of the universe, God.

For fifty years now, we have seen the handwriting on the wall. For twenty years conservationists have been intensely at work, trying to stem the insidious flow of resource destruction toward the gates of doom. But now, just as during the crest of the Missouri flood, a light begins to show, the bend in the road suddenly looms. Resource conservation is beginning to pay off.

We stand at the threshold of a glorious future: more food for everyone, better medical care, more comforts, better recreation, great technological advances in chemistry, physics, biology. But the best is yet to be and our greatness as a nation and a people is still to come.

The big question is, have we the moral stamina and courage and character to keep pace with the changing world? Can we advance spiritually, morally, in goodness and in right, the same way as we can advance in science? Let's hope so. And in conservation, let's hope we can keep that road bending—ever bending, so that eventually we can rebuild that which has been lost to us. We are making significant strides in forest conservation, in water development, in game restoration, in soil rebuilding. We are learning new things in agriculture, in such things as soil development, nutrition, heredity, disease control, plant and animal life processes. The alchemists are giving us new vistas into a darkened world and the discoveries that are being made are making man happier.

But there is danger in the process of scientific development unless we keep our inner strength and will as a people. Freedom can be lost if the source of our strength is filtered away.

The scientific mind cannot function freely in a world controlled by despots, no more than a swimmer can stay long underwater. It is this freedom of the mind in the democratic state that promises us great things in the years ahead.

Yet freedom is not inherited in the true sense of the word. It must be earned. Each generation must earn it; must safeguard it, then pass it on to others.

In conservation's awakening we have the assurance of a healthy and free life. We can see great progress ahead for mankind if we will only use the gifts of nature and our talents wisely.

Take the field of wildlife conservation alone. There has been noteworthy progress, and progress will continue. Today corps of trained specialists—wildlifers, biologists, fish technicians, conservation educators—are leading the fight for intelligent game management. Twenty years ago the specialists in this field were hardly known. Now they are everywhere, in every state, bringing to the people the facts that must be known if we are to exist in a changing world.

We now have the know-how, the technology, to feed the whole world if we want to. Yet at the same time we cannot risk our own freedom in the process. Conservation's awakening will not let it happen.

Yes, the future of Virginia, of America, of the world is yet before us—and so is a glorious destiny such as undreamed of by man. But we should humbly ask ourselves, are we as a moral people qualified to accept the great era that lies before us.

Everyone is working to make the world a better place to live in and with the help of the Divine Being—the best is yet to be! The road is starting to bend.—J. J. S.

CAN WE OVERCOME OUR WATER TROUBLES?

By BERNARD FRANK*

WATER IN ONE WAY or another affects the lives, happiness, and destinies of every one of us. Everything we eat, everything we wear, the natural or artificial shelter that protects man and animal from heat and cold, wind and rain requires water in its making. To make each gallon of whiskey we consume takes 100 gallons of water. Each pound of textile requires 10 to 75 gallons of this universal fluid. The trees that yield the wood we use so plentifully in thousands of ways take 500 pounds of moisture out of the soil for each pound of wood they produce.

Every day in the year the householders of our country who depend on public supplies spend one and a half million dollars for safe drinking, cooking and washing water. Domestic use accounts for one-quarter of the total national consumption of around 50,000 billion gallons annually for all purposes.

Families, communities, and industries in the 9 southeastern states consume some 14 billion gallons every day. This comes to one-tenth of the national total. Here the value of water purchased for home and factory amounts to over $250 million per year. This water in turn makes possible the production and sale of over $3 billion worth of products.

Our water demands (except for hydroelectric power generation, navigation, etc.) account for a mere 9 percent of the total annual runoff from the springs, brooks, creeks, and rivers of the nation. Back in 1900, with half the people we have now, our total use was less than 2 percent of the nation's runoff, or only one-sixth as much as today. Yet even then we suffered short or impaired water supplies.

The catch is that suitable water is seldom available when and where we conveniently would like to have it. Many southeastern cities and smaller communities, as in the Piedmont of Virginia, the Carolinas and Georgia know this far too well. Another trouble is that from time immemorial we have looked upon our streams as open sewers and fouled them so badly with home and factory refuse—and with soil washed off the clean-cultivated, ill-grazed, burned and wastefully logged hillsides—as to render them unfit for man, bird, or beast.

A few generations ago the waters in the upper reaches of the Potomac, James, Roanoke, Pee Dee, and other rivers were safe to drink without treatment. Fishing was excellent, wildlife virile and abundant. The Shenandoah, for example, ranked

*Mr. Frank is a U. S. Forest Service authority on water resources (See page 26). He is co-author of the book *Water, Land, and People.*

Commission photo by Kesteloo

By measuring the flow of a stream, clues are provided as to the conditions of soil and plant growth on the watershed.

Commission photo by Kesteloo

Clean sparkling waters the country over attract zealous anglers from hundreds of miles away, eager to forget the office for a day.

among the finest smallmouth bass fishing streams in the country and attracted zealous anglers from hundreds of miles away. Here and in other streams, the recreationists of past generations were not repelled by the sight of stench and turbid, polluted flows. Few unsightly deposits of mud and debris marred their course from the headwaters to the bays.

Our man-made water headaches have plagued us a long time. Every day in the year floods cost the people of the United States an average of $3 million in property damages alone. This does not include the serious effects upon physical and mental health engendered by waterborne sickness and community fear and uncertainty, or the still further unmeasured losses to our recreational, fish and wildlife resources. Who can tell the full extent of such national disasters as the billion and a half dollar Kansas River floods of last July? The year 1951—nearly a century since the Federal Government initiated its flood control efforts—will go down as the worst so far in American history.

A lesser known feature of water damages is the evidence from scores of surveys that the smaller, frequent, muddy overbank flows on the little streams produce three-quarters of our billion dollar annual flood bill, as against only one-quarter from the less common spectacular big floods. This fact is worth bearing in mind when we come later to consider ways, means, and responsibilities for curbing these devastating and largely unnecessary disruptions to our national household.

Flood damages represent only part of the headaches from untamed or wastefully used water flow. Stream pollution from 22,000 separate industrial and municipal sources throughout the United States costs hundreds of millions of dollars annually in terms of poisoned water supplies and ruined fish, wildfowl, and wildlife habitat, among other adverse effects. And to this we must add the losses from silt pollution—the product of soil bled off mismanaged crop, pasture, and forest lands, unstable streambanks, and poorly built and operated rural roads and highways.

Since 1900, Federal expenditures to cope with floods and water shortages have amounted to over $10 billion. Present plans call for spending well over $60 billion more to clean up, tame, and put to useful work the nation's rivers, and to improve their watersheds. Cleaning up the 22,000 pollution sources alone will cost $9-12 billion over the next 10 years. Such pollution is especially bothersome on the James, Roanoke, South Fork of the Shenandoah, North Fork of the Holston, and the upper

Potomac.

The nine southeastern states bear a heavy share of the national burden. The use of water has jumped in the past two decades mainly because of heavily increased demands by chemical, textile, and pulp and paper mills, air conditioning units, and the supplemental irrigation of farm crops. To make matters worse, the streams in this region have steadily become more erratic; both overbank and minimum flows go to greater extremes and more often than before, and sediment has piled up in the costly reservoirs and channels.

The upper Potomac River represents a good example of these trends. About 10 years ago the United States Department of Agriculture investigated the causes of floods and the possibility of reducing them by conservation measures. Annual dollar damages (in terms of 1950 prices) were estimated at about $2 million; flood damages accounted for one and a half million dollars, soil depletion for another one-third of a million. The balance represented the cost of dredging the channels and harbors around Washington, D. C., plus the higher cost of clearing up and purifying the muddy public water supplies.

On examining the uplands, the surveyors found that three-fourths of the crop land and one-third of the pasture land were actively eroding. Although half the watershed was forested, a third of this land was contributing swift runoff, and often sand and gravel, to the streams. Nor was it providing satisfactory timber growth or food and shelter for game.

Similar surveys on the Coosa River Watershed in Georgia, and more recently on the Savannah, Roanoke, and Pee Dee, confirm what was found on the Potomac; namely, that higher and more frequent flooding and other unfavorable conditions are commonly traceable to wasteful and inefficient land-use practices.

The building of big reservoirs and dams downstream cannot begin to correct such situations at the source, and they themselves will fall prey to silt washed down from the uplands. This is especially important to remember in view of the fact that the over draft on underground waters, especially in the Piedmont, is causing more and more towns, cities, and industries to develop surface storage reservoirs as a means of overcoming present or threatening shortages.

Our water control and conservation needs boil down to a few simple things: how to get water where we want it, when and how we want it, and with the lowest possible long-time outlay of ma-

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Photo courtesy U. S. Forest Service

Stream improvements add much to the fishing values of mountain waters, but such work is wasted unless the watershed is protected.

Commission photo by Kesteloo

Protected watersheds aid community development. This small reservoir on the Washington National Forest is providing water for Stuarts Draft and vicinity.

Photo courtesy S. C. S.

Serious floods and debris damages may come from watersheds mistreated in the past, although they now may be well managed.

Tired? Worn out? Nerves on edge?

Want to live a longer, happier life—then

GO FISHING

by ROY LYMAN SEXTON, M.D.

SOME years ago I was sitting in a motorboat anchored off Catalina Island in the Pacific. With me was a well-known psychiatrist. We were talking and drinking beer and relaxing, after a wonderful day of marlin fishing. Wrapped in a warm blanket of fog, we could hear distant muffled surf and the soothing swish and slap of water against our hull. The world and its troubles seemed as far away as some other planet.

That night my friend made a remark I'll always remember. "You practice internal medicine," he said, "while I try to help sick minds. Yet there's a cure for both minds and bodies that is better than anything else we doctors can prescribe."

"What's that?" I asked.

"I mean something that can prevent high blood pressure, heart disease, ulcers, or a nervous breakdown. My prescription is to do exactly what we've been doing today: Go fishing."

I could have guessed what was on his mind because I've been practicing medicine for more than 25 years and have been giving patients exactly the same advice. In fact, I've seen almost as much sickness cured with a rod and reel as by surgery, and a lot more cheaply, which leads me to believe that the best form of health insurance in the world is a regular vacation fishing trip. The harder a man works and the bigger his job, the more he needs this insurance.

I explained all this recently to a Washington lawyer who was a patient of mine. He agreed that I was probably right but said he couldn't afford time off just then to go fishing.

"Which can you afford more easily," I asked, "two weeks of fishing now, or a month in the hospital later?"

He decided to go fishing.

As a doctor I've taken this miraculous medicine all my life. I've fished in Alaska and the Bering Sea, in the Caribbean, the Mediterranean, the Atlantic, the Pacific, and the Gulf of Mexico. I've never broken any records, and I'm not interested in spinning tall tales about the big ones that got away. But, as both a doctor and a fisherman, I'd like to tell you why I think fishing is the most fascinating sport in the world and the best cure for what ails you. If nothing ails you, so much the better; you can go fishing and stay well.

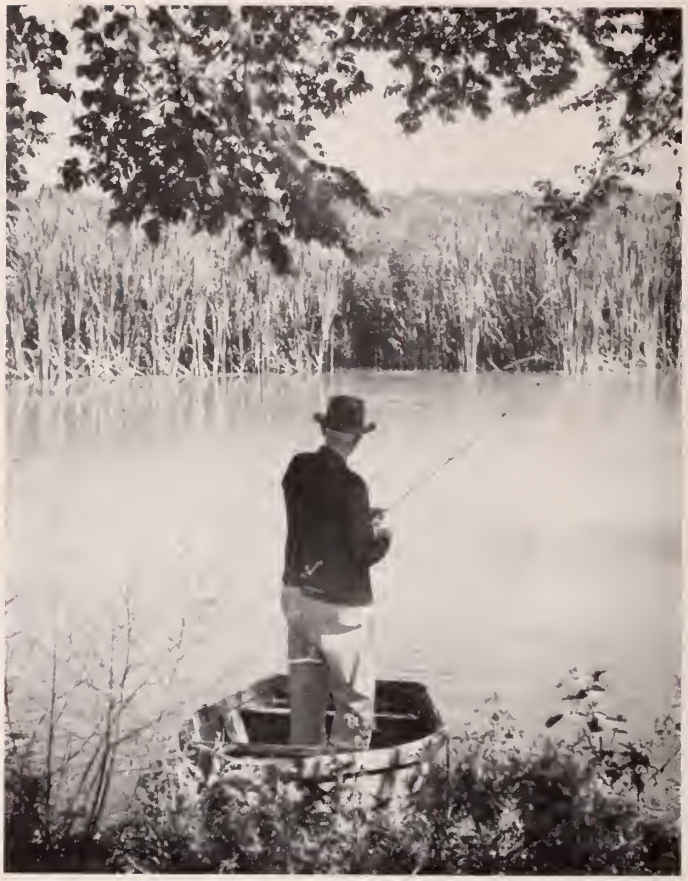

Photo courtesy H. Armstrong Roberts

A good remedy for high blood pressure, heart disease, ulcers or a nervous breakdown.

Luckily, there's no spot in America where you can't find good fishing within a few hours' traveling time from home, with modern transportation facilities. I've run into landlocked Ozark trout fishermen trying their hands at blue-fin tuna off Long Island, and fished with New Yorkers for salmon in Puget Sound. A doctor friend of mine who lives in Utah has fished everywhere from the Yellowstone River, in Montana, to the Gulf of Mexico. He travels with a 20-foot motor launch on a trailer behind his car, and not long ago he drove from Salt Lake City to Norfolk, Va., shoved his boat into the water, and set out down the inland waterway to Florida.

Since I was born in Washington, D. C., and have lived there, near the Atlantic Ocean, all my life, I'm a salt-water fisherman by training and preference. And since my medical practice has always

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been in the nation's capital, that's where I developed my theory that fishing is good medicine. In fact, I think it's fortunate for the country that the Government was established so close to so many good fishing waters. When the pressure of office becomes too great, all the President has to do is go aboard his yacht, order the anchor up, and bring out the fishing gear. The lowest-paid government clerk can pull out into the Potomac in a rented rowboat, spend Saturday or Sunday catching spot or croakers, and go back to work feeling like a new person.

As an example of how much good a fishing trip can do, I recall a trip to Florida I made some years back as medical adviser to the National Park Service. One of my duties was to look after the health of a dozen U. S. Senators who were going down to survey the proposed site of the Everglades National Park, which had not yet been established. Several of the senators were elderly men, and certainly none of us was in shape for the lower reaches of the Everglades, which is still one of the wildest and most primitive parts of America.

For a week we explored Cape Sable, Whitewater Bay, the Ten Thousand Islands, and the Shark River, where every inlet looks alike and getting out alive depends on the skill of your guide. There were alligators to look out for, and swarms of mosquitoes and suspicious Seminole Indians. One of our boats was lost for an entire night, and part of the survey had to be completed from a blimp. The going was rough, and I was kept busy ministering to cases of indigestion, sunburn, insect bites, and exhaustion.

Then one day our guide pointed out a rumpus going on in the shallow water along the bank of a river we were exploring. "That's tarpon," he said. "They like to roll there, in among the mangrove roots." He went into the boat's cabin and brought out some light bass rods and plugs and passed them around.

I made a cast in the direction of the mangroves and reeled in my plug. Nothing happened until I pulled the lure from the water about a yard from the boat, when a pair of jaws came up after it and the rod was almost jerked from my hands. A fish with scales as big as silver quarters leaped six feet in the air and almost came into the boat on top of me. With one shake of its head it threw the hook from its mouth, went back into the water with a tremendous splash, and left me standing there shaking with excitement, hardly knowing what had happened.

From that moment on, everyone's aches and pains were forgotten. We found tarpon in practically every river and creek in the park area, and all around the Ten Thousand Islands. At one time three of us in the same boat had 50- and 60-pound fish jumping at the ends of our lines at once. As if by magic, the senators were cured of their fatigue and indigestion, and all they could think about was who was going to land the biggest fish. By the time we got back to Washington I no longer had a group of sick and tired men on my hands, but the fittest and finest-looking bunch of legislators on Capitol Hill.

When I say fishing is the best medicine in the world, I don't just mean that it will make a man forget his mosquito bites and sunburn. It will do a great deal more than that. I've found that fishing helps prevent one of the most common causes of illness we have today—the hypertension that leads to heart disease and stomach ulcers.

After many years of practice, a doctor can see a cardiac or nervous attack coming on well in advance. Every human being has a limit to the load of responsibility, worry, and work he can stand before his health is affected. The doctor evaluates the load and looks for the symptoms: exhaustion, headaches, nervousness, high blood pressure, indigestion. When the load appears too great—and few persons go to the doctor until it is—then it's time to prescribe a remedy. The one I've found most effective is simply two or three weeks of fishing.

You'd be surprised how many patients never think of doing this except under doctor's orders. During World War II, one of my patients was an army colonel who had been called to Washington to do an important job in military supply. He worked like a demon 7 days a week; and when the invasion of North Africa began, he worked even harder getting supplies to the front. He was a robust man who refused to admit that he could be ill. "All I need," he said when he came to me, "is a little tonic. You know, Doc—something to help me sleep and straighten out my digestion."

I examined the colonel and finally got the rest of the story from him. His blood was abnormal, and he admitted that he had been losing control of himself lately. A few days before, he had struck his son for some minor annoyance, and when his wife had tried to calm him down he had hurled a dish through the kitchen window. It was a perfect case of tension, leading inevitably to a heart attack or a nervous collapse.

"I can give you something to help you sleep and your appetite," I told him, "but that won't cure what ails you."

"For Pete's sake, Doc," he said, turning pale, "What do you have to do?"

"Not a thing. But there's something *you* have to do. Take tomorow off and go fishing."

HE THOUGHT I was joking. He protested that he was busy trying to help win a war, that he hadn't wasted time on things like fishing since he'd been a youngster, that he'd even forgotten how to fish. I replied firmly that if he were going to be my patient he would have to follow my orders, which were to proceed to a place on the river where rowboats were rented, and to get a boat, a can of bait, and a fishing rod from the boatman. I pulled a map out of my desk and showed him a place down the Potomac where there were plenty of spot and croakers, and some big weakfish.

"That's doctor's orders for tomorrow and every Sunday hereafter," I said. "And as soon as you can get a ten-day furlough we'll plan a real fishing trip."

Two days later the colonel phoned me and said he'd had his first good night's sleep in a month. An afternoon rowing on the river, the chance to get far away from telephones and official duties, and the mild excitement of stalking, playing, and capturing a few fish had ironed out the kinks in his system. He had slept eight hours that night because he was physically tired and mentally relaxed.

In a short time he was spending week ends on Chesapeake Bay fishing for striped bass—one of the most plentiful inhabitants of inshore waters from Maine to Virginia—and for his 10-day furlough he flew up to New York and took a train to Montauk Point, on the tip of Long Island, and landed a 260-pound broadbill. Instead of "wasting time fishing," as he had complained, he realized that he had saved himself a stretch in the hospital, and had had the time of his life doing it.

Obviously, fishing wouldn't cure anyone of anything if it weren't one of the most fascinating pastimes in the world. And because it can be done in every state in the Union, and on anything from a back-acre pond or stream to a yacht in the middle of the ocean, it is the one universal outdoor sport. It can be done in complete solitude or with the entire family or a boatload of pals. You can spend 50 cents to rent a rowboat, or $100 a day at a fancy resort. And whether you haul in a 2-pound rockfish on a hand line or a 600-pound tuna on heavy tackle, the thrill is the same.

Although fishing was not formerly thought of as a woman's sport, it has become one today. There's no accurate way of estimating the number of women fishing enthusiasts in America, but from personal observation I'd say it was growing fast. Many deep-sea fishermen are always accompanied by their wives, who pull in prize 800-pound tuna and 400-pound swordfish. In recommending fishing to patients, I've found that if the wife can share the husband's interest in the sport, marital harmony can often be improved as well as health.

One of the most satisfactory family fishing enterprises I ever saw belongs to a couple of Florida friends of mine, Mike and Helen Pickett. They went up North during the war and made good money in an Akron, Ohio, airplane plant. But he and Helen weren't happy, and the only time Mike really felt good was when he was out on a stream or lake with a fishing rod. So they went back to Florida and settled down in Eureka, a little town along the St. Johns River where the bass fishing is superb.

Mike borrowed a bulldozer, dug a small pond, and stocked it with shiners, the favorite bait of bass fishermen. He tried sprinkling manure and various kinds of stock feed on the pond, and found a way to increase the growth of plankton, the essential food for shiners. As the shiners multiplied, so did Mike's business, and today he sells $25 worth of shiners to fishermen every morning, runs his own fishing camp, and lives happily with his wife and son in a house he built himself. It's a business that has given him health, happiness, and all the spare time he and Helen want for their own fishing.

I NEVER travel anywhere, on business or pleasure, without taking a simple tackle kit along. When I'm headed inland, a telescoping metal trout rod, a reel, and a few flies take up practically no space in my luggage. If I'm going near salt water, then a short bass rod for casting and a long-handled boat rod of bamboo or fiber-glass can be carried in an aluminum tube fastened to a suitcase. Once a man has been bitten by the fishing bug, he has to be ready to fish anywhere, any time.

Fishermen will argue for hours that one particular kind of fishing is better than any other. Invariably, of course, they mean the kind they do. Many ardent anglers tell me they wouldn't fish salt water, and say that the greatest sport on earth is to spend a day in a pair of waders, whipping a stream for trout and enjoying the beauty of wooded country.

Well, right now I will start a fight by stating my own belief that ocean fishing beats the inland variety. I know I won't change the minds of any freshwater musky or bass fishermen. But my preference is based on the scientific fact that marine life in the oceans is more comprehensive than in fresh water. There's more to catch, more to eat, and more to study and learn about—from oysters, clams, crabs, mussels, lobsters, shrimps, and turtles,

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So You Belong to a Rod and Gun Club

by PHILIP BARSKE

Commission photo by Kesteloo

As an affiliated group, sportsmen have a tremendous opportunity to work as cooperators rather than stumbling blocks in a fish and game program.

AS A PROFESSIONAL CONSERVATIONIST, I have no magic wand to wave over gullied fields to restore their lost fertility and no supernatural formula with which to clear up smelling and befouled streams; nor can I conjure some jinni who might overnight transform our forest lands so that timber crops might be assured and wildlife given proper habitat and the opportunity to thrive.

We do have a practical formula for doing this job; but it is a hard one and a slow one. Intelligent public interest, soundly planned effort and work are the only solution.

Human initiative made our world what it is today. We have destroyed great quantities of our lands, our waters and our wildlife; but by the same hand that destroyed, we can create!

I'll not ask any given group or regional group to settle and solve all of our conservation problems, but I should like to make a few suggestions that would help our national, state, and local wildlife situation—if the local sportsmen's clubs are really interested in a constructive conservation program.

The average sportsman's conception of responsibility for fish and game abundance or scarcity too often begins and ends with the state fish and game commission. The state department, and usually the director, becomes the punching bag if the hatch is poor, if the fish don't bite, or even if a storm blows up on the opening day of the quail season.

Actually we humans can control only a portion of our game situation. We can manage or mismanage the land, and we can show what a real sportsman is like. In the long run, it is nature that makes or breaks the game crop, dependent naturally, on how much of a chance we give her.

A state game department can only be as good as the sportsmen allow it to be or want it to be. A strong department without the sportsmen's backing is just about as effective as a pitch fork for shovelling snow. Any state conservation department reflects the public attitude. Our days of just hoping for good game and fish crops are over, and we now realize that fish and game production is a highly technical business which requires the best trained and most capable men that money can hire. Get such men. If you have them, hold on to them and give them your support and backing.

Organized sportsmen have long been the most powerful force in shaping fish and game activities—both for good and for bad.

As an affiliated group, sportsmen have a tremendous opportunity to work as cooperators rather than as stumbling blocks in a fish and game program. I do not mean to imply that fish and game clubs should be "yes men" on every occasion, but I do mean that much more intelligent thinking should go into club demands.

Too many clubs have but one idea in mind—the pressuring of the state officials for more fish or more birds. The days of narrow fish and game management as such are limited, for we now realize that all wildlife is directly tied to land use and that the role played by fish and game interests is strictly secondary. We get fish and game only if the land is healthy enough to produce it. A scarcity of wildlife is an indication of unhealthy and unwise use of land.

To be real wildlifers, in other words, we must

Habitat restoration projects by sportsmen create local interest and help improve game conditions generally throughout the state.

Commission staff photo

A good club project is the "fish pond." These Halifax County sportsmen are well pleased with their recently constructed club pond.

consider our basic resources—soil, water, and trees. If we have a healthy condition in our forests, we get game; if our streams are clean and pure, we get fish; and if our land is so managed to prevent soil erosion and to increase fertility, we can produce game.

We are not lone rangers in this wildlife business. To be successful, a fish and game program must be wrapped around a good land-use program. To accomplish this, the citizens of the state must understand related problems. So, from the level of having an efficient department, we must consider the educational approach. At the moment, education is what every interest is attempting to harness its program to. Conservation is a right good program and one that is easily understood, but a difficult one to get over to the uninitiated. If our citizens could be educated to the real meaning of conservation, our program of wildlife improvement would be much easier.

A club has a wonderful opportunity for spreading the gospel—and many times the most effective place to begin is right at home. Local clubs can sponsor exhibits and programs that tell the story of conservation in easily understood ways. The services of many state agencies are available to the citizens. Any fish and game department that does not have an active educational program is falling down on the job.

An excellent method of employing education is for a club to tackle a local project and employ all the conservation practices known to do the job. Many progressive clubs have tackled stream improvement, habitat restoration, and demonstration projects and the results are always gratifying to all concerned.

Local projects create local interest, and that is where we feel like doing our best work. But the conservation problem is not entirely a local one and interest in statewide and national programs should be ever in mind, for they directly influence our local interests.

On a statewide basis, particularly in backing legislation, the organized sportsmen have a tremendous power to do much good or to make serious mistakes. In any issue, consider the facts very carefully, and try to decide any issue on the basis of what will be best for our natural resources.

Unless we can project our thinking into the future and make every effort to develop well-rounded fish and game programs, our chances of saving future hunting and fishing for the general public will vanish before our eyes.

People have the power to make laws and to develop programs, but too often this privilege is misused and handled on a selfish and narrow basis. It is the obligation of every citizen and particularly of the sportsmen, for he has a special interest in a special cause, an obligation to understand fully the various programs that are set up, and to back good ones to the hilt or sink the poor ones.

No one person or any one group is going to change the conservation picture greatly, but all of the small groups working toward a common goal with a common cause can accomplish wonders. It is your duty as a citizen and as a sportsman to take some share of the responsibility, for the idea of "letting George do it" ends up with the job still undone. If you are worthy of the name of Sportsman, then the way to show it is by action.

OUR WATER TROUBLES

(*Continued from page 7*)

terials and energy; in short, how to make water serve us better, and hurt us less.

How Watersheds Function

Part of the answer to our water problems lies in carefully planned large-scale engineering works. But these are only a partial solution. Part of the answer lies in strengthening the present soil and forest conservation programs of the states in cooperation with Federal agencies like the Soil Conservation Service, Forest Service, Extension Service, Agricultural Conservation Program of the Production and Marketing Administration, and Fish and Wildlife Service. But these activities as now organized are not enough either.

The best answer that science has given us thus far calls for a unified watershed approach. This approach is based on the natural law that each acre of land on the farms, in the forests, in the villages, towns, and cities is part of a collecting basin or watershed; and that each big watershed, like that of the Santee-Cooper, for instance, is made up of a great number and variety of small watersheds ranging from a fraction of an acre to several square miles in size. This approach means that we must plan and carry out our conservation work not in terms of separate farm fields, forest tracts, or even whole farms, but rather in terms of groups of farms, together with the forests on the highlands, the roads that connect them, the communities with their paved streets that straddle them, and the watercourses from top to bottom. This is the same kind of approach that modern medical science takes. Doctors no longer confine their diagnoses and treatments to the ailing or injured parts of a body. They consider the person as a whole because they know that when one part is affected, the functioning of the whole body may get out of joint. So, too, must we look at watersheds as whole organisms if our diagnoses are to be sound and our treatments to be effective.

We have some pretty good ideas on why watersheds get sick, what happens when they do, and how to go about restoring them to health. In fact, if we could apply the scientific knowledge we have now—that is, if the people who own the farm and forest lands were willing or able to apply this know-how—many of our present water headaches would soon disappear.

We call the application of this know-how "Watershed Management." Watershed management means applying the natural laws governing the interrelationships of soil, climate, plant growth, animal life, and stream flow to complete drainage basins. These principles apply just as effectively to large areas as to small ones. They apply to the 14,500 square mile watershed of the Potomac River just as much as to the 338 square mile Goose Creek drainage in Loudoun and Fauquier Counties, Virginia. We know that the flow of a stream reflects the condition of its watershed; that it provides useful indicators of the net effects of land-use practices, either detrimental or beneficial. These indicators include the total annual amount of flow, the regularity of flow through the seasons, the frequencies and extremes of high and low discharges, and the clarity and purity of the water.

It has taken the watershed scientists many years of thought and effort to figure these things out. If we were as sensitive as fish to the physical, chemical, and biological changes that occur in streams following disturbances to soil and plant growth, the effects of our activities on the land would be quickly, in some cases shockingly, apparent. Lacking the sensitivity of aquatic life we have had to depend on systematic, continuous observations, experiments, and analyses, plus costly trial and error, to convince ourselves that soil, plants, animals, and waterflow are inseparable parts of our environment.

It is safe to say that whatever we do on the land has some effect upon water. It affects the amount of rain or snow that reaches the surface, the amount that enters the soil, and how fast, the rate at which water passes downward through each layer of the soil for storage and use by plant growth, and the amount that moves out of the soil.

One of the big jobs of those who study watersheds is to find out how and when these relationships apply. Tucked away in the Nantahala Mountains of western North Carolina, on the headwaters of the Little Tennessee River, is the Forest Service's 5,400 acre Coweeta Hydrologic Laboratory. This well forested laboratory has been in operation since the early thirties. Nature has divided the entire watershed into 40 smaller units, each a complete basin in itself. In order to gain a thorough understanding of how such areas function, the experts have been studying the water cycle from the moment rain falls on the crowns of the trees on the mile-high upper slopes until the water passes by the lowest stream gage a half mile lower in altitude. For this purpose 31 stream flow measuring weirs, 75 rain gages, and 25 observation wells, among other devices, have been installed.

On one 23 acre experimental area the forest was

(*Continued on page 22*)

The Parade of

VIRGINIA
1,000,000 Y

By ANN

VISUALIZE THE STATE of Virginia one million years ago. The gigantic mammoth crashed through the hardwood forests of Fauquier County. The mastodon trumpeted on the banks of the York River. The giant peccary stalked its prey in the Shenandoah Valley. The ground sloth and the tapir plodded awkwardly in the southern shadows of the Blue Ridge Mountains.

This was the Age of Mammals—a time when today's mammalian ancestry flourished. The mammals had triumphed over the preceeding Age of Reptiles. The dinosaur had disappeared and therefore was no longer a challenge to mammalian supremacy. No living power threatened the domain of the mammals.

The rise of mammals probably resulted from the inability of the reptiles to adapt themselves to the changing environment. Too, disease may have been an important factor. Possibly the mammals fed on the eggs of the reptiles, but this would have played only a small role in the progress of mammals. The warm-blooded vetebrates, therefore, adapted more readily to the changing climate, vegetation, and terrain and were now rising to rule the world.

The geographical distribution of the warm-blooded rulers was due largely to migrations made possibly by land bridges connecting North America

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with Asia and South America. North America witnessed a great parade of mammal wonders at this time. Through the forests and over the grasslands ranged the mammoth and mastodon, the primitive camels, llamas, tapirs, and ground sloths. These primitive forms are, of course, extinct and even their descendents have vanished from this continent. The early bison, armadillo, horse, peccary, and the many strange ancestors of Virginia's game animals made a weird menagerie. The modern forms of these are still present in North America, though some in limited numbers.

The Great Ice Age

The changing climate was an important factor affecting migration and distribution of mammals. And about a million years ago, in the geological timetable, the temperature began a gradual drop. One of the earth's most amazing experiences was taking place. The climate grew colder and great continental glaciers amassed and moved slowly southward. Over a period of several thousand years, as the glaciers approached, whole forests grew southward and hordes of mammals pushed ahead of the glacial cold, seeking warmer climate and following the fleeing vegetation. The state of Florida, even in the Great Ice Age, was a popular winter resort.

In this flight for survival southern North America became even more densely populated. Competition was great in the mass movement and as a result many species perished and many migrated to other continents. This explains, to a large degree, the extinction of some species and the disappearance of others from this continent.

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cimal forms—a vast arena of

parading prehistoric wildlife.

According to geologists, there were four glacial stages; in each stage a glacial advance was followed by a widespread retreat. The last retreat, it is thought, began only 30,000 years ago. Each stage found wildlife preceding the advance of the ice sheet southward and following its retreat northward. Possibly the northern element in the mammal kingdom was the first to follow up the retreat. This element included the mammoth and mastodon, with their protective hairy covering. Then the mid-latitude element and the tropical element followed. These three elements have been defined by several geologists to illustrate geographical distribution and the various types of fauna.

Although the glacial boundary extended as far south as New Mexico in western United States, it advanced only in Pennsylvania and New Jersey on the Atlantic Coast. Glacial streams, however, carried sediment and debris southward to the sea and rivers. This debris built up the delta of the Mississippi River and lined the whole Atlantic Coast with a deposit of fine sediment.

Conclusively, the state of Virginia remained free of the actual ice sheets but was invaded by fleeing wildlife.

Pleistocene Fossils

The triumph of mammals and the Great Ice Age are placed, geologically, in the Pleistocene Epoch, which began about 1,000,000 years ago. That certain mammals lived in that Epoch is evidenced by the many fossil remains unearthed in Pleistocene rock levels all over the country. The mid-western and far-western states have furnished the most evidence, but many discoveries have also been made in Florida and the northeastern states. In Virginia, a lesser number of fossils have been discovered in Pleistocene deposits to support the evidence of mammals characteristic to that Epoch.

A galaxy of mammals ranged throughout North America and possibly many of them were evident in Virginia. However, attempts to unearth fossils in Virginia have been limited and the extent of the state's animal population is unknown. The majority of fossil discoveries have been made by M. D. Mount and O. A. Peterson in Smyth County and by Professor E. D. Cope in Wythe County.

At Saltville, Smyth County in 1917, discovery was made of a portion of the lower jaw of a ground sloth, *Megalonyx*. The ground sloth was a shaggy mammal about 11 feet in length, including the tail which served as a third hind foot. This cumbrous, slow-moving creature was armed with large retractile claws. Each foot had five toes, unlike the modern two and three-toed sloths of South America. Teeth fragments of a species of ground sloth, *Megalonyx jeffersonii,* were found near Ivanhoe, Wythe County. This species was named for Thomas Jefferson who presented a paper on the subject before the American Philosophical Society in 1797. Thus in America began the study of vertebrate life of past geological periods. This genus, *Megalonyx,* disappeared with the Pleistocene and was known only in North America.

The remains of mastodons and mammoths have been found in York, Prince George, Fauquier, Washington, Smyth, Alleghany, Bath, and Rockingham counties. These gigantic mammals had a thick covering of hair, a very long trunk or proboscis, and lengthy curved tusks. The mammoths, now extinct, stood 11 to 13 feet and belonged to the same family as the modern elephants of Asia and Africa. They were covered with an inner coat of dense woolly hair and an outer coat of long coarse hair which may have been 20 inches long. The skull was high and dome-shaped which permitted growth of two large tusks, sometimes reaching 16 feet. The mastodons were the most abundant of the large trunk-bearing mammals, especially in forest regions east of the Mississippi, and had a lower flatter skull than the mammoth. Unlike the mammoth, they had no woolly under coat and seldom reached a height of more than nine feet six inches.

Common in the eastern forests was the Pleistocene tapir which resembled a short-legged horse with a flexible snout. Teeth of a species of tapir, *Tapirus haysii,* were found in a New River cave in Wythe County. This primitive species was larger and heavier than the modern tapir of Central and South America and southern Asia, and was adapted to a colder climate and a different vegetation than the existing tropical tapirs. However, like the modern species, it was a slow-moving, peaceable mammal which lived in the forests and frequently entered nearby water.

Fossils of a primitive horse, *Equus complicatus,* were found in Washington and Wythe counties, but species of today's domestic breeds were not found. The primitive forest-type horse of the eastern states was cow-pony size and was the most abundant of the species. Pleistocene horses were numerous and varied, and ranged in size from a Shetland pony to the largest modern draught horse. Throughout their development the limbs, neck and face elongated, the arched back was straightened, the foot structure elongated and changed from five original toes to the single digit of today's horses.

(*Continued on page* 23)

GO FISHING

(*Continued from page 10*)

to tuna, tarpon, wahoo, barracuda, broadbill, and shark.

On top of that, there is the pleasure of learning the secrets of wind, weather, current, and tide. Handling your boat, whether it's a rented dory or outboard, a charter boat hired by the day, or your own sailboat or cruiser, adds to the job of salt-water fishing. A man can't possibly get farther away from his troubles and tensions than when he's out on open water with a rod in his hands and the breeze blowing in his face.

Of course, the devotees of fresh-water angling have plenty to boast about also, because no part of the globe offers them better sport than the North American continent. Nearly every state stocks its streams and lakes with plenty of game fish, such as largemouth and smallmouth bass and various kinds of trout. The state fish and game commission or department of conservation supplies information on license fees, open seasons, and the legal limits on catches.

For excellent wilderness fishing closer to home I recommend the national parks. Glacier National Park in Montana, for example, offers 1,500 square miles of beautiful country with plenty of cutthroat, rainbow, and lake trout, and several varieties of whitefish. In Olympic National Park, in Washington, trout fishing is good in the high lakes and streams reached by wild trails, and the scenery is even better. Best of all the national parks for trout fishing is probably the Yellowstone, in Wyoming.

However, when fresh-water fishermen boast of the superiority of their specialty, they speak most often of the muskie, biggest and toughest of all inland fish. While in Ontario and Wisconsin are the best muskie-hunting grounds, they are also plentiful in parts of Minnesota, Michigan, New York, and a few other states. There are not so many of the biggest ones left these days, but a lucky fisherman can still count on an occasional battle with a 40-pounder in such superior muskie haunts as White Sand Lake, Wisconsin, and Lake St. Clair, Michigan.

When it comes to good eating, however, the finest food fish, in my opinion, is the salmon, special pride of our Pacific Northwest and Canada. Many Seattle families I know take their vacation every year on one of the bays along the shore of Juan de Fuca Strait, out toward the tip of Cape Flattery, where from May to October they can fish for 20- to 40-pound chinook and the smaller silver salmon. For those who want to travel farther, Vancouver Island provides some of the finest salmon water in the world.

Standard equipment on these salmon-fishing trips consists of a tent, outboard motorboat, pressure cooker, and some Mason jars or cans. With this and a bit of luck, a fisherman can put up enough delicious fish for a winter's supply. Every salmon fancier has his own seasoning formula; I simply use a scant teaspoon of salt and 2 tablespoons of olive oil for each pint jar or 1-pound can.

MY OWN fishing experience began as a boy, close to home on the Potomac River. Gradually it led me farther afield, to the Virginia, Maryland, and Delaware shores and out onto the Atlantic, until by this time I've done most of the kinds of fishing that can be found off the shores of North America—and that means the best fishing in the world. In the Pacific I've pulled king crab 6 feet across from deepwater in Bristol Bay, Alaska, caught 40-pound king salmon in Juan de Fuca Strait, and fished for albacore, sailfish, marlin, swordfish, and black sea bass off California. Yet I'm willing to go out on a limb like a typical fisherman and claim that the fishing I know best actually *is* the best—and by that I mean the Atlantic coast,

Don't forget the youngsters! The sooner we can raise a generation of conservationists, properly indoctrinated in clean sportsmanship and healthy outdoor pursuits, the sooner our great future will be assured. Fishing is only one of many character-building pastimes.

Photo courtesy S. C. S

anywhere from Nova Scotia to the Bahamas. If you want good fishing, young man, I say come East!

Today, fortunately, no fishing ground is too far from home for the angler who loves to travel. Take the case of a doctor like myself, who can't spend long periods away from his patients. I have my boat tied up in the Potomac and, when the spirit moves me, run down Chesapeake Bay into the ocean, and in a few days I've fished my way around Cape Hatteras, tied up the boat at Beaufort, N. C., and hopped a train back to Washington. As soon as I can get away again, I'm off to pick up the boat and continue on down to Charleston or Savannah. I can still get back to Washington overnight by train, do some work, then return to the boat and roll on down to Jacksonville, St. Augustine, and Miami. And I'm still—thanks to the wonders of air travel—within a few hours of my office and patients.

You don't need a boat of your own to do this, of course, since at any port on the Atlantic seaboard boats of all kinds can be hired reasonably, along with tackle, bait, and plenty of free advice thrown in. Wherever you go, always talk to the man who rents you a boat and sells you bait, because he's the local authority on the best fishing.

I've owned a boat of some kind since I was 20, and was a deep-dyed disciple of Izaak Walton long before that. Fishing is part of my happiest boyhood memories of family life. My mother and father both came to Washington from the West, and loved the outdoors. Our vacations used to find us loaded down with tenting and duffel, going aboard one of the old side-wheelers known as Potomac River landing boats. We would drop down to a camp site on either the Maryland or Virginia side and set up our tent along a stream emptying into the river. My favorite spot was near Bridges Creek, where George Washington fished and played as a boy, and where his recently restored birthplace stands as a national monument.

Today, in the family auto or by fast train and airplane, it's easy to roam far afield in search of fascinating vacation spots. But, to us, even 60 miles down-river seemed a long way from home, and the fresh fish we caught were a welcome change of diet in the days before sea food could be shipped in refrigeration. We caught spot, trout, snappers, and perch, and the fish we didn't eat were put down in salt for winter. A half-inch of common salt was placed in the bottom of a 5-gallon stone crock, then alternate layers of cleaned fish and salt added until the crock was full. An electric freezer will do the job much better now, but this old method is still a good one. Before cooking the salted fish, soak them overnight in cold water in the refrigerator, and your friends will think they're eating fresh fish.

My own early days of fishing convinced me that every youngster should be sent off with a boat and tackle of his own as soon as possible. When I was a boy I didn't learn about life from watching the birds and bees, but from peering under water through a stovepipe with a piece of glass taped over the end. I watched big fish eating little ones, and being eaten in turn by bigger ones, and figured out that such was the way of nature. Fishing also helps teach self-reliance and resourcefulness. As the boy gets bigger, the fish get bigger, and so does the excitement of the sport.

We grow up and are worried about real or imaginary ailments, or are on the verge of a nervous breakdown because the boss looks grouchy, there's nothing that will do more good than to head offshore in an open boat and get hooked to a big fish. I guarantee it'll cure almost anything from falling hair to incipient cirrhosis of the liver.

For some of the best medicine in the world, I recommend blue-fin tuna, just about the biggest thing you can go after with rod and reel. You can start chasing them down in the Bahamas in June, off the Jersey coast in August, and off Massachusetts, Maine, and Nova Scotia in August and September. Pacific fishermen do well off Catalina Island during July and August.

One summer, a couple of years ago, I was feeling a bit jittery from overwork. So I took a trip up to Ipswich Bay, Mass., and hired an old lobsterman to take me out in his boat after blue-fin. We anchored on a ledge he knew where the bottom dropped off suddenly to about 30 feet, and proceeded to cut up herring into small pieces and drop them overboard. As every fisherman knows, this is called "chumming"—a free cafeteria service which is supposed to attract hungry customers. After half an hour of it I put a generous hunk of herring on a big hook and lowered it over the side with a cork float, to a depth of 20 feet. The boat rocked peacefully at anchor, the sun was warm and soothing, and we went on cutting chum and tossing it out. I didn't care much whether anything happened or not.

It did, though. My cork disappeared, I jumped for the reel, and the skipper jumped for his engine controls. We slipped our anchor and started the boat out to sea after something that was going down and away from us as fast as a torpedo.

I couldn't tell at first how big the fish was, but an hour later I had a pretty good idea. He was still

Commission photo by Shomon

Photo courtesy H. Armstrong Roberts

Trout or bass or bream—it doesn't matter what you're after. Just go fishing!

on the end of my line; he'd gone down like a submarine, and I ached all over from trying to pump him back up. I'd seen him once on the surface, a couple of hundred yards away, and he looked nearly as big as our boat.

By this time the tuna had taken us 20 miles offshore and a squall was coming up. It was nip and tuck whether we were going to get the fish before the storm got us. The old lobsterman didn't say a word, but just kept our bow to the waves. I reached for my knife to cut the line, and then remembered that it was a borrowed one worth $50. For once I wished I'd never baited the hook in the first place.

Needless to say, I wouldn't be telling the story if we hadn't gotten back to port. In addition, we brought in a fish that weighed 675 pounds. That's not a prize—in fact, it doesn't approach even the women's tuna record. But it's plenty big, and there's one thing I'll give that particular blue-fin: It cured the attack of nerves I'd felt coming on back in Washington; I had no insomnia that night.

Another fish I'd like to recommend to anyone suffering from swivel-chair itch, commuter's cramp, or any other city-bred malady, is the bonefish. The first of this breed I ever encountered were feeding in shallow water at the edge of a reef in the Florida keys, with their tails flipping out of the water. I cast my line ahead of them baited with shrimp, and waited. First my reel unwound slowly for a few feet, then I gave a sharp yank to set the hook—and I was attached to a miniature tornado. The fish took 100 yards of line in its first wild rush. It went around my boat in a great ark, whisked under a mangrove root, broke the line, and left me standing there looking foolish.

I can promise that a bonefish will make a monkey out of anybody catching one for the first time. It's impossible to bring them into the boat until they're exhausted, and they seem practically indestructible. I fought one almost an hour while it circled my boat, just to prove that I had as much stubborn cussedness as the fish.

The bonefish isn't very big; the largest I ever caught was 8 pounds, and they don't go much over 12. But there are many anglers—and I'm one—who think that this is the fastest, most furious fighter in the water. I'm willing to argue this out with any salmon, muskie, or bass fisherman in the audience. If you'd like to find out for yourself, I recommend a trip to Florida. The best bonefishing I know is among the keys and up the east coast. I've even caught them five minutes away from the Miami docks off Government Cut. But however far you have to travel for them, I guarantee it will be worth the trip.

While you're in Florida, you'll also want to go out and get hooked to a sailfish or swordfish. Sailfish are most plentiful in the Gulf Stream off Palm Beach, Fort Lauderdale, and Miami, but you can fish for marlin as far north as Montauk, Long Island, and for broadbill all the way up to Nova Scotia in the summer months.

I believe, therefore, that as long as men fish there will always be something new to catch. And each time you go out you'll have something to learn. I said so not long ago to a patient who is prominent in the Federal Government, and who had been feeling run down. "If you think I need exercise and fresh air, I'll take up golf," he said. "You can keep your fishing." I agreed that if golf would get his mind off his troubles he should go ahead.

A few weeks passed, and when he came in to see me again I asked him about his golf game. He looked a little sheepish. "Doc," he said, "I played at the club with three different foursomes, and all we talked about was politics. I got so upset that I went down and rented a rowboat, and I've been out alone on the river every week end since. The thing I like best about fish—they don't talk."

Virginia's Game Bird Series

THE BLACK DUCK

(Anas rubripes)

FEW DUCKS are so wary, quick, and alert as the black duck. Because of these characteristics, it has continued to be one of the most abundant waterfowl species. Despite the fact that it is greedily sought as a fine table delicacy, it continues to abound in goodly numbers throughout our Atlantic coastal waters.

The black duck, commonly referred to as the black mallard, blue-winged duck, and black-jack, was originally confined to the eastern portion of North America. It was found from Labrador southward, but it has spread westward in recent years, and now reaches North Dakota. It is abundant along our tidal rivers and common around Virginia's Eastern Shore. It is perhaps Virginia's most common duck and certainly the best known.

This duck is a uniformly dark sooty-black bird with a lighter head and neck showing fine dark streaks. Gleaming white underwing surfaces are the best field identification marks in flight. Apparently only adult winter males have clear yellow bills and bright red feet.

Nesting in small groups and gathering in great flocks in the fall are characteristic of the black ducks. During the season of the year when they are not breeding they spend the day in rafts far out in open water, from which they depart to do their feeding at night. Submerged plants make up a greater portion of their diet. Pondweeds, eelgrass, and wild celery are taken in about equal amounts with seeds of sedges, grasses, and grains. They heartily eat animal foods as well. Most of these come from shallow flats exposed by low tide, where mussels and shellfish abound.

Black ducks usually build their nests in well hidden places on the ground near water, but occasionally they build them in old crow or hawk nests up in trees. The nest is made up of grasses and leaves with a lining of down that is added to as incubation progresses. Nine eggs to the nest is about average, and they vary from creamy-white to greenish-buff. About 30 days is required for the eggs to hatch. A short time after hatching the ducklings follow their mother to water and swim.

The destruction of marsh habitat by drainage operations in northeastern United States and Canada has had a serious effect on the black duck. It is here where the black duck breeds so profusely and unless more conservation measures are taken, the duck will have a hard time. In Virginia wintering and feeding grounds are being assured. Two federal refuges, Back Bay and Chincoteague, and the recently purchased state refuge of Hog Island are helping to maintain the duck in Virginia.

Virginia's Furbearer Series

THE RED FOX

(Vulpes fulva)

NO ANIMAL is more traditionally Virginian than the red fox. Glowing accounts of "the chase" have been written, antedating the time of George Washington. Every fall, black derby hats, red coats, and galloping steeds are a part of the state's landscape, as fox hunting enthusiasts set out on horseback behind the bellowing hounds, eager for "the chase."

Red foxes are common throughout the state. They prefer fields and meadows and woods borders, and survive just as well in areas heavily cultivated as in wilder regions where the gray fox is at home.

The "big red" is widely hunted in the state, especially in northern Virginia, but is little affected by it. It never seems to suffer, no matter how heavy the hunting. In fact, the red fox may even enjoy being chased, if the terrain is in its favor. More often than not the sly old red will give the hounds the slip, leaving them baying and panting and confused. The characteristic slyness possessed by the red fox adds greatly to its value as a game animal.

The red fox's den is often under a bush or thicket in an open field or under a log in open woods. It may frequently be seen sprawled before the den enjoying the morning sun. It will usually scamper off, away from the den, rather than go back into its burrow. Perhaps this is done to keep the den from being noticed.

Stomach analyses of foxes show that rabbits and mice form the bulk of their diet, along with berries, nuts, and corn in the summer and fall. When mice and rabbits are scarce, foxes turn to poultry and game birds for their livelihood and can become destructive. But where foxes are scarce because of over-trapping and shooting, mice multiply to the point where they destroy crops and vegetation and game birds become scarce for lack of food. Thus, while the fox itself may be destructive, its presence is needed to maintain a check on other vermin. Unlike the gray fox, the red fox carries its young for about 51 days, and the 4 to 10 young are born in the den in early spring.

Disease, especially rabies, takes an untold number of both red and gray foxes each year. At times rabies may become epidemic in nature, and wipe out foxes from an entire area. At such times danger to livestock, poultry, and people is at a peak.

Foxes have few natural enemies. Next to disease, hunters and trappers and farmers kill the most foxes in Virginia. The value of its fur has dropped considerably, but because of the great popularity of fox hunting, Reynard ranks high on the list of important game animals in Virginia.

OUR WATER TROUBLES

(Continued from page 13)

cleared off 12 years ago and turned over to a local family to handle according to the time-honored mountain farming practices. They planted 6 acres to corn and left 12 acres to pasture some cattle. The remaining 5 acres were too rough and remained idle. An adjacent watershed of similar size and character was left in its hardwood forest cover to serve as a check.

Nothing special happened for the first three years. Then signs of unbalance began to show up. In 1946 one of the usual heavy rains struck both watersheds at the same time. The peak flow from the untouched check area was about the same as that from a similar storm several years before. Markedly different was the behavior of the farmed area. Its peak flow rose to over 4 times that from the similar storm which had occurred while it was still forested. Since 1946 the flood peaks here have gone up about 20 times. The presently pastured part alone yields 60 percent of the quick surface runoff following storms although it occupies only 20 percent of the total area. One storm alone washed 76 tons of soil and rock off the clean-cultivated slope in 65 minutes.

The flood and silt damages caused by the log skidding and hauling practices prevalent in the Southern Appalachian Mountains and Piedmont were revealed in an experiment on another watershed. During the logging operations water turbidities following heavy rains rose to 5,700 parts of silt per million parts of water (ppm), as against a mere 80 ppm from the adjacent unlogged check area.

Exactly how much a given combination of farm, forest, and road building practices will affect stream flow cannot be told in advance. In order to find out, it is necessary to obtain certain basic facts. These include the distribution and intensity of rainfall and the kind and amount of runoff that results, for each season of the year; the water storage characteristics of the different soils, i.e., their depths and water-holding capacities, and the rates at which they can absorb rain-water under different kinds and densities of plant cover and litter. Finally, we need to determine how deep the roots of various plants go in each of the different soils. This last kind of information is highly important because roots greatly influence the movement and storage of water in the soil, and hence the amounts and rates at which it will enter stream channels.

Once we have obtained the above information, we can predict more accurately what land-use practices are most likely to reduce flood discharges and raise low summer flows. And we can also predict what kinds of crop, pasture, and forest practices are likely to change the amount of stream flow both during the crop growing season and over the entire year.

Since most of the land in the southeast is privately owned, the burden of rebuilding damaged watersheds and of maintaining and improving their soils and plant cover falls primarily on the individual farm and forest operator. However, because the public is vitally concerned over flood protection, ample supplies of unpolluted water for drinking and manufacturing purposes, recreation, etc., all of us have a stake in and share responsibility for improving our watersheds. One of the most effective ways is for people on the farms to work together with people in the towns and cities in this common effort. The success of such voluntary associations as the Brandywine Valley Association in Pennsylvania, among the 250 such associations throughout the country, illustrates what can be done when farmers, forest owners, sportsmen, recreationists, bankers, and businessmen join forces to nurse their local watersheds back to good health. In the Southeast a fine start has been made in the activities of the soil conservation districts and the public-private cooperative programs for fire protection, forest management, road drainage and erosion control, and fish and wildlife habitat improvement. The next big step is to reorient these programs along watershed lines, based on the latest scientific findings.

It does not take much looking ahead—and every parent owes to his children to look ahead—to visualize the prospects for greater family and community security, human happiness, and well-being in such cooperative undertakings. Farmers will benefit from the material and spiritual satisfactions which derive from well-maintained and attractive fields; forest operators, large and small, will reap lasting benefits from producing continuous supplies of sound timber from healthy soil; businessmen will profit from the increased and less erratic purchasing power of farm and urban families; and recreationists and sportsmen will better enjoy the relaxing influence of the bright landscape, clear-flowing waters, and well-nourished, abundant wildlife. Indeed, all groups who share in the planning, development, and maintenance of community watershed projects will stand to gain in the enhanced mental and physical health that comes from achieving a better understanding with our fellows and a more adequate appreciation of the natural environment which so intimately influences our daily lives.

VIRGINIA WILDLIFE 1,000,000 YEARS AGO

(*Continued from page 16*)

In Augusta County were found lower jaw fragments of a primitive peccary or pig-like mammal, *Platygonus compressus*. This gregarious species was the most common of the Pleistocene peccaries and roamed the plains as well as the forest regions. It was much larger and longer-legged than the modern collared peccary and white-lipped peccary and was armed with two small, yet effective, tusks. It is thought the peccaries originated in North America, but their only existing relatives are found in Texas, Central and South America.

Teeth of an extinct species of *Bison* were found in Smyth County, while excavating for Saltville's water reservoir, and in Wythe County. The bison, a member of the ox-tribe, was characterized structurally by its great shoulder hump. Pleistocene bison roamed the entire continent, extending into Alaska, but were most plentiful on the western plains. The majority of the species were much larger than the existing "buffalo." The horns of one species had a spread of over six feet and another species measured six feet through the shoulders; neither species has been evidenced in Virginia.

The presence of primitive deer, *Odocoileus*, is shown by teeth and other fragments of *Odocoileus virginianus* (Virginia white-tailed deer) found in Pleistocene rock levels of a Wythe County cave. The appearance of the species, which probably migrated from Asia, differed only slightly from the Virginia white-tailed deer of today. Various primitive deer were three or four-horned; some were hornless like the modern musk-deer and Chinese water-deer. There has been some speculation on the ancestry of the modern northern and southern deer-types, and it is unfortunate that knowledge is limited on the ancestry of Virginia's most popular and plentiful big game animal.

Other Pleistocene Mammals

Possibly many more of the Pleistocene mammals lived in Virginia, but evidence is lacking to support their existence here. Fossils of primitive camels were uncovered in Pennsylvania and Tennessee and in great numbers in Florida, where they fled the approaching glaciers. Great llamas extended as far north as Alaska. The northern giant beaver, as large as the black bear, was found principally in New York, Indiana, Ohio, and Michigan. Primitive species of moose, musk-ox, and antelope, which migrated from Asia, lived during the Pleistocene, but they remained chiefly northern inhabitants.

Several species of the sabre-toothed cat spread over the United States, as did the primitive wolves. These wolves were much larger than the wolves of today, and possessed massive teeth. The gray wolf, coyote, and red fox were also represented in the Pleistocene in primitive forms.

Confined to the south was an enormous armadillo-like creature which was found in Florida, Texas, and Mexico. Also in the south was a large cat which exceeded in size the largest of the existing members of that family. It was, however, a relative and rival of the saber-toothed cat.

The small primitive mammals resembled those of today but Pleistocene evidence is lacking among fossil discoveries. Primitive forms of the badger, raccoon, weasel, otter, skunk, and porcupine undoubtedly did exist. In Virginia, a few fossil discoveries have been made of primitive opossums, squirrels, rabbits, muskrats, shrews and mice.

The Parade

One million years ago wildlife in North America was abundant and varied, with some mammals of gigantic proportions. And it is mostly the very large mammals which have become extinct. Examples of many primitive species are evidenced in Virginia. The presence of these mammals resulted from changing climates and spreading vegetation. These conditions brought about extensive migrations. Many mammals originated in the New World; some remained, others disappeared from the continent during migrations. Many of the Old World mammals migrated to this continent; some thrived, others returned to the Old World, and still others became extinct.

And so, in Virginia there was a great assemblage of mammal life. Virginia was a scene of many blood-thirsty battles for survival; a scene of great plodding hulks grazing on the grasslands; a scene of small creatures scurrying through the underbrush; a scene of peaceable animals splashing in the streams and feeding along the riverbanks.

One million years ago Virginia was a vast arena of parading wildlife!

Field Force Notes

Game Commission Revises Warden Supervisory Districts

Effective April 1, 1952 the Virginia Commission of Game and Inland Fisheries will have six game warden supervisory districts instead of the customary five.

The new districts and their supervisors are: George Washington District with Harry Johnson of Arlington as supervisor; Thomas Jefferson District with recently appointed Clemmer Miller of Deerfield as new supervisor; Hampton Roads District with newly appointed R. O. Halstead of Creeds as new game warden supervisor; Patrick Henry District with I. H. Vassar in charge; Jeb Stuart District with J. W. Francis of Stuart as supervisor; and Daniel Boone District with M. Wheeler Kesterson of Ewing, former law division chief, as district supervisor.

South Holston Reservoir Opens to Fishing For First Time May 30

South Holston Reservoir will be open to public fishing for the first time since its waters were impounded, May 30.

The purpose of the creel census on South Holston Reservoir at this time is to provide fishermen information about changing fish populations and information regarding what can be expected in the future. Because it was just recently impounded, a creel census will be taken to observe the changes which occur in fish populations.

This year it is expected that a large number of just-legal (10 inches) bass will be taken. By next year there should be less in number, but those caught should be larger. It is expected that South Holston Reservoir will be at its top carrying capacity in the next two years. The reason is that in any new impoundment there is a rapid rate of decomposition of vegetation at the lake-bottom, increasing water fertility. After two years the carrying capacity of the reservoir will be reduced, because of the decrease in water fertility.

Hunt Club Seeks to Restore Bath County Deer Range

The deer range in Bath County is somewhat depleted in some localities, and the Rattlesnake Ridge Hunt Club is trying to rebuild it. They have completed an 85 acre planting project, aimed at providing more food for the deer, according to G. C. Rogers, club president, and W. R. Harris, secretary-treasurer.

One-half the area was planted to clover and orchard grass, and one-half to corn and soya beans. The planted area is located near Douthat State Park in Bath County.

Alexandria and Lynchburg I.W.L. Hold Sportsmen Shows

The week of April 22-26 found Alexandria and Lynchburg I.W.L. Chapters holding their annual Sportsmen Shows.

Game wardens Stuart Purks and Fred Brown were on hand in Alexandria to answer questions pertaining to game and fish laws. State game technician Kit Shaffer and game warden Pat Monaghan distributed seed for wildlife plantings in Lynchburg.

Large Bald Eagle Drops Dead

J. J. Westbrook, special game warden for Henrico County, submitted the picture of the dead bald eagle, found on the Turkey Island Farm in Henrico County, on the James River.

No evidence of being shot or injured was found. It is assumed that it died of disease or just old age, as several people saw it when it was alive, and it appeared to be sick. The eagle's wing span measured seven feet.

A bald eagle which dropped dead on a Henrico County farm.

COMMISSION RECEIVES WINBORNE MILLPOND

Winborne Millpond, located in Southampton County, has been turned over to the Commission of Game and Inland Fisheries, by the Camp Manufacturing Company, Franklin, Virginia.

The Commission has accepted the body of water and will develop it as a public fishing pond. It is now being stocked with bass and bream from the Commission hatcheries. Fishing will be permitted beginning June 1.

ADVISORY COUNCIL ON RESOURCE-USE EDUCATION LAUNCHED

Culminating a five-year effort to get conservation educators together for a broader understanding of resource-use objectives, the recent organization meeting of the Virginia Resource-Use Education Council comes as a creditable action on the part of a number of prominent Virginia conservationists. The Council was organized in Richmond on March 31.

Representatives of leading land-use agencies, the colleges, and the State Board of Education took part in the conference.

The group elected J. J. Shomon as its chairman for the first year; P. H. DeHart was named vice chairman, and Robert R. Bowers, secretary.

Named to the executive committee were J. J. Shomon, P. H. DeHart, A. L. Wingo, A. H. Paessler, and John H. Gwathmey.

The objective of the Council was put as "to bring about a better understanding and working relationship among the existing agencies and organizations dealing with natural resources and to develop and implement a broader educational program in these fields."

GOVERNOR OF MAINE SENDS GOVERNOR BATTLE SEAFOOD TREASURE CHEST

During a recent trip to Virginia, Roland H. Cobb, Maine's director of the Game and Fish Commission, brought with him a sea chest of seafoods to be presented to Governor John S. Battle. In Governor Battle's absence, the chest was presented to I. T. Quinn, executive director of the Commission of Game and Inland Fisheries, who later presented it to Governor Battle.

I. T. Quinn (left) shown accepting a seafood chest from Maine's Commissioner Cobb.

Within the seafood chest were lobster, codfish, and other principle food fishes for which the state of Maine is well known.

The Indigo Bunting

One of our best-known birds is the indigo bunting. He is a little larger than a chipping sparrow, with no wing bars, and indigo blue covers his body. This is the male, and in summer plumage. The female dresses in an inconspicuous brown, though around the wings and tail you should see just a little of her husband's blue.

But look at that bird up there on the wire. He looks entirely black. Why? A very interesting reason. Some colors come from pigment in the feathers; some come from the structure of the feather, which has tiny ridges and valleys, and breaks up the rays of light. The indigo bunting has a combination of both pigment and "prisms." From a distance he often looks black; close up he is blue.

But whatever the light, he has just one job. From the day of his coming in late April or early May he devotes himself to singing. He sings all day long. He may start singing in the lower branches of his tree (and he will have his favorite tree), and sing from branch to branch, all the way to the top. Then he is in his glory. Right on the tip-most twig he will pour out his soul.

But where is his little brown-clad wife? She is down there in the low thicket, attending to the affairs of the nest. She has hid it, just a little cup, down almost to the ground. You will hardly find it. But if you should try, then the male will leave his tree top and his song to help his wife discourage you.

The young birds will come in two broods, from late May to the first of August. After 10 to 13 days they are out of the nest, and are probably in the corn field with their parents.

When the home is broken up the indigo loses his song. I have him recorded as singing a little in the fourth week of August. But it is a half-hearted effort. He loses even his indigo coat for one splotched with the brown of the female and young. By early October he is gone. He winters in Cuba or Central America. —Rev. W. B. McIlwaine

Wildlife Questions and Answers

Ques.: Is there such a thing as a barren doe deer?

Ans.: Due perhaps to an injury, disease, or infertility at birth—yes. Due to old age—no. Does held in captivity have borne fawns, year after year, for 13 years. It is very unlikely that many deer live this long in the wild. Mature does that fail to carry young simply haven't been bred.

Ques.: When was the eagle adopted as our national emblem?

Ans.: The bald eagle was adopted as our national emblem by the Congress on June 20, 1782.

Ques.: Can you actually drown a fish?

Ans.: Yes and no. Fish habitually live in the water and do not drown. However, if we relax our definition just a little, fish suffocate whenever the oxygen supply in water dwindles below what they need to breathe. Sometimes fish happen to get wedged between stones or tangled in water vegetation in such a way that their gill-workings are obstructed, causing suffocation.

Ques.: Is it true the skunk is in some way related to the mink?

Ans.: Yes, they both belong to the same family, Mustelidae.

Ques.: What are the principal enemies of deer, excluding hunters?

Ans.: Why exclude hunters? The only hunter who is an enemy of the deer is the illegal hunter. The others only harvest their fair share of the deer and cannot be considered, other than in the strictest sense, as enemies. Well-meaning but misinformed persons who pick up what they think are "orphan" fawns do great harm. Their mothers are nearby, and the fawns are not being neglected. Wildcats and foxes may take a few deer but many times that number are killed by stray dogs. Fires, disease, and starvation also take their toll, but by far the worst of these is starvation—a condition much more common than people realize.

Ques.: Actually, what size flocks were the passenger pigeons found in, and when did the last one die?

Ans.: In 1808 Alexander Wilson wrote of a flock he saw containing over two billion birds; yet in 1914 the last known passenger pigeon died in captivity. Rewards have been offered for authentic news of a nesting pair, or a single bird, but so far no awards have been claimed.

Ques.: Is the passenger pigeon the only extinct species, or are there others?

Ans.: Indeed not. You may be surprised to know that there are already 41 species of wildlife that are extinct or now threatened with extinction. They are: great auk, Labrador duck, Carolina paroquet, Guadalupe caracara, heath hen, Maine great mink, California grizzly, Texas grizzly, Tejon grizzly, plains grizzly, Merriam elk, Texas mountain sheep, whooping crane, trumpeter swan, great white heron, Eskimo curlew, masked bobwhite, everglades kite, gray whale, Greenland whale, Atlantic right whale, passenger pigeon, Florida manatee, Sierra and Nelson mountain sheep, Eastern fox squirrel, Atlantic walrus, Pacific walrus, Guadalupe fur seal, plains wolf, kit fox, sea otter, desert fox, wolverine, blackfooted ferret, ivory billed woodpecker, laysan teal, ipswich sparrow, sandhill crane, glacier bear, and fisher.

"Strange—Two Thousand Miles and We Haven't Heard A Peep Out Of Your Mother."

Ques.: Much has been said about the parental care of such birds as quail, but are the parents of all predatory birds, such as the bald eagle, devoted parents, or do they desert their young easily?

Ans.: The bald eagle is an exceedingly loyal and affectionate parent. It will not desert its young even if the tree on which it is nesting is in flames.

Ques.: What state sells the most hunting licenses and the most fishing licenses?

Ans.: Michigan led in sales of both hunting and fishing licenses during the fiscal year 1951, selling 1,037.633 hunting licenses, and 1,089,864 fishing licenses.

Ques.: About how many hunting and fishing licenses are sold in the United States in a year?

Ans.: Fishing licenses sold during the fiscal year ending 1951 totaled 16,026,699, producing a gross revenue of $35,554,285. Hunting licenses sold during the same period numbered 12,660,993, for which nimrods spent $37,840,791.

Hunters and anglers in the 48 states paid $73,379,076 during the year ending June 30, 1951, for the privilege of enjoying their favorite sports.

Ques.: How may litters of young does a cottontail produce each year?

Ans.: As many as five, but usually around three litters a year are about average in Virginia.

Ques.: Are there any more timber wolves in Virginia? Were they ever abundant?

Ans.: At one time the timber wolf abounded over the entire state. As far as is known, the last Virginia wolf was killed in Tazewell County in 1910.

Ques.: Is it true that a deer's eyes are immovable?

Ans.: Yes. Exhaustive studies have been made on this question, and it has been proven by a number of biologists, including research men of the U. S. Fish and Wildlife Service, and it was found that the eyeballs of deer in their sockets are immovable. Hence the reason a deer must turn its head in the direction it wants to see.

Ques.: E. L. Beals of Chetels, Wisconsin, asks why it is that practically all fish and game departments advocate the destruction of house cats?

Ans.: Few if any of these departments advocate the destruction of house cats that remain near their place of residence, such as barns, houses, and other places where the owner feeds them regularly and they do not have to seek out their own food. It is the stray cat that these departments want destroyed, for they are not only a menace to birds, but to young rabbits, squirrels, and other game animals. These animals are unnatural to the landscape and their cunningness is difficult for wild creatures to cope with. It is not the cat that is to blame, but rather it is the person that throws it out along the road in strange country to get rid of it instead of destroying it as he should. These cats form an extra burden upon wild creatures and should be dealt with in the proper manner.

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Once rich in mountain fastness, Virginia's Blue Ridge bears mute testimony to early misuse of the land.

Overcutting and overgrazing have reduced mountain ranges to bald spots, waste land, and desolation.

A Conservation Lesson

WE NEEDN'T GO FAR to see examples of land misuse. The ugly scars of waste and abuse and mismanagement are everywhere. Virginia has its share of exploited resources.

Here, for example, are some scenes along the famed Blue Ridge Parkway — an area said by some to have been the most abused mountain range in the east.

Commission photos by Shomon

This was once a hardwood forest. Now it is a scar on the landscape, open to the sun, wind and erosion.

Some abuses still continue. Here is a small forest fire just getting underway over the ridge.

So savage has misuse been in some sections that only years of restoration work will change the picture.